introduction to the calculus, there is plenty of material in the rest of the book for those who prefer not to take up the calculus at this time.

Many who teach analytic geometry to students of whom it is required, will think the book too difficult, but others will find it well adapted to their needs. In any case, it is a book to be considered in choosing a text, and presents a distinct advance over the usual textbook.

The general appearance and typography of the book are excellent.

It should be added that Professor Bôcher has written a syllabus for a course in solid analytic geometry following the same lines as this book.

ELIJAH SWIFT.

UNIVERSITY OF VERMONT.

PROBLEMS AND SOLUTIONS.

EDITED BY B. F. FINKEL AND R. P. BAKER.

[Send all Communications to B. F. FINKEL, Springfield, Mo.]

PROBLEMS FOR SOLUTION.

ALGEBRA.

448. Proposed by W. D. CAIRNS, Oberlin College.

In the *Washington* (D. C.) *Times*, Mr. W. A. Dayton called attention some weeks ago to a curious repetition of digits in the decimal value of 1/115. If this decimal, which we print in the form $0.\dot{8}6956521739130\ 43478260\dot{}$ be divided by two, the result is $0.\dot{4}3478260\ 86956521739130\dot{}$, the fourteen-digit and eight-digit groups having been thus interchanged. A similar result, as he points out, is obtained if the original decimal value is divided by four. Mr. Dayton asks that this curiosity be explained.

449. Proposed by FRANK IRWIN, University of California.

Sum the expression

$$1 + 2\binom{k+1}{k} + 3\binom{k+2}{k} + \cdots + (n-k+1)\binom{n}{k}.$$

Also show how to sum

$$1\cdot 2 + 2\cdot 3\binom{k+1}{k} + 3\cdot 4\binom{k+2}{k} + \cdots + (n-k+1)(n-k+2)\binom{n}{k},$$

$$1\cdot 2\cdot 3 + 2\cdot 3\cdot 4\binom{k+1}{k} + 3\cdot 4\cdot 5\binom{k+2}{k} + \cdots + (n-k+1)(n-k+2)(n-k+3)\binom{n}{k},$$

etc., where $\binom{l}{k}$ is used to denote the coefficient of x^k in $(1+x)^l$.

GEOMETRY.

479. Proposed by NATHAN ALTSHILLER, University of Colorado.

Find the locus of the point whose polars (polar planes) with respect to two given conics (quadrics), are perpendicular to each other.

480. Proposed by CLIFFORD N. MILLS, Brookings, S. Dak.

Of equal quadrilaterals on the same base, that which has the least perimeter must have the angles not adjacent to the base equal to each other.